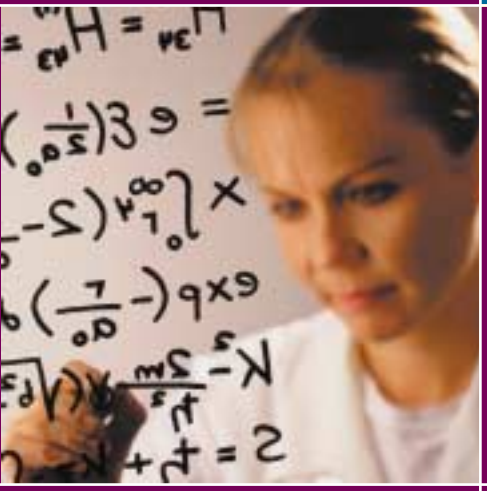


Crossroads:
Meeting Challenges for Credible Science

The EPA Science Advisory Board
Accomplishments Report for Fiscal Year 2002

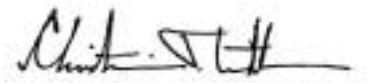
Dear Readers:

On behalf of the U.S. Environmental Protection Agency's Science Advisory Board, I am pleased to present the first *SAB Accomplishments Report*.

This report highlights the SAB's success in providing comprehensive analyses and counsel to strengthen the scientific and technical basis for Agency decisions. In Fiscal Year 2002, the Board's advice had a positive impact on the production and use of science at the EPA with regard to a number of challenging issues. Board members and consultants drafted key reports in the areas of risk assessment, benefits assessment, research planning, and assessing and reporting ecological conditions.

The SAB Staff Office strengthened its internal capabilities and made the Board's operations more transparent. It implemented a new panel formation process and enhanced efforts to involve external stakeholders in the SAB's work to gain the benefits of their unique insights and perspectives.

As the EPA addresses tough environmental challenges in the year ahead, we will continue to look to the Science Advisory Board for the expert advice and counsel so essential to the pursuit of our mission.



Christine Todd Whitman
U.S. EPA Administrator

Introduction

Background

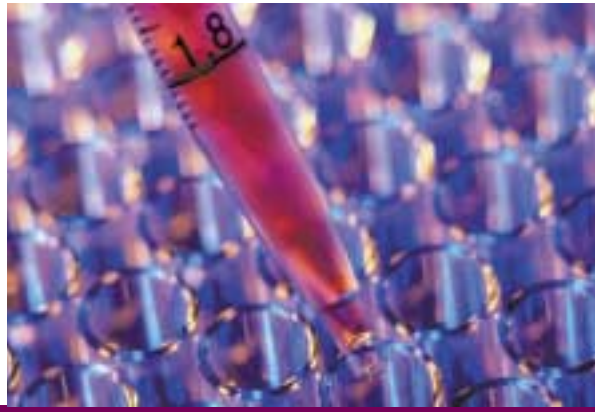
Since 1978, when the Science Advisory Board (SAB) was created by Congress, the Board has provided advice to the Agency to improve the EPA's ability to make sound environmental decisions. Congress created the SAB to provide independent advice and peer review to the EPA's Administrator and to Congress on the scientific and technical aspects of environmental problems and issues. Experts on the Board and the EPA SAB Staff Office work to produce advice that is technically and scientifically sound, independent, balanced, and useful to the Agency.

The SAB Executive Committee, the leadership of the Board, set a goal for the Board: to make a positive difference in the production and use of science at the EPA.

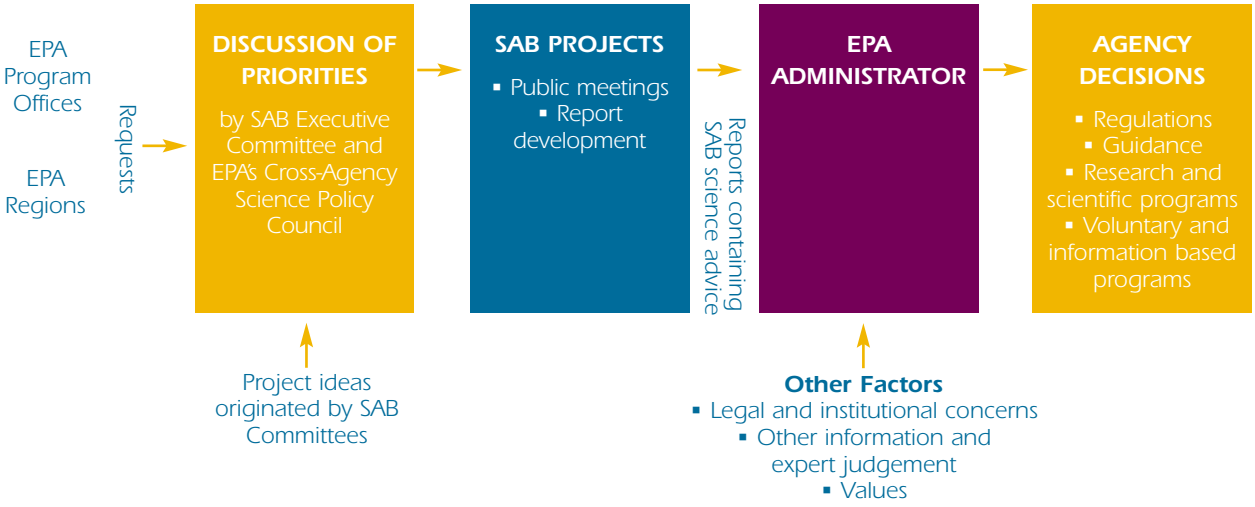
In the *Science Advisory Board Strategic Plan (1998)*, the Executive Committee stated that the Board's mission is to: "Provide independent, relevant advice on the scientific and technical dimensions of the Agency's actions to carry out its own mission of protecting human health and safeguarding the natural environment on which life depends."

To achieve that goal, the Board focuses on technical issues, not policy issues; risk assessment and engineering issues, not risk management; the adequacy of the scientific foundation on which an Agency position (e.g., a regulatory standard) is built, not the position itself. The SAB recognizes the Agency's need to make decisions on environmental policy, risk management, and regulations, but does not advise the Agency on the merits of those decisions. Instead it limits its advice to the scientific and technical underpinnings on which those decisions rest. Where the Board's advice does touch on policy issues, it takes special care to note and highlight those instances.

Science Advisory Board FY 2002 activities have included science advice on topics where the EPA has been at the crossroads, facing choices about priorities for research in environmental science and risk management choices that will be



Where SAB Advice Fits into Environmental Protection at the EPA



influenced by science. In risk assessment projects, such as trichloroethylene, the Board has responded to the need for highly visible reviews of contentious scientific issues.

SAB Advice Process

The SAB develops advice in response to Agency requests and in response to original project ideas developed by SAB Committees for an Agency client. The SAB staff works both with the Executive Committee of the SAB and the senior leadership of the EPA through EPA's Science Policy Council to choose the slate of activities the Board will undertake.

The scope of the Board's work is potentially as wide as all of the scientific and technical issues associated with environmental problems. It can involve advice on human health risk assessment for a specific chemical; advice on the guidelines to be used for assessing risks to human health in general or the risks to children in particular; advice on methodologies for assessing ecological risks; advice on Agency draft cost-benefit studies; evaluation of engineering options for addressing environmental problems; or advice on the use of data and methods from the social sciences to solve these problems. As a result, the work of the Board calls for experts from a wide variety of scientific and technical disciplines.

The Board provides several kinds of written advice to the Agency. It issues peer review *reports* of Agency documents. It writes *advisories*, when it has reviewed Agency works-in-progress. It initiates *commentaries* or more extensive *original reports* on topics that it believes are important to environmental protection. It provides the Agency an opportunity for *consultations* at the earliest stages of development of a project to gain insights from independent members and consultants.

Finally, it hosts *workshops* on important scientific issues, in which the Board itself does not provide advice but instead sponsors meetings where the Agency can be stimulated by the work of highly qualified technical people.

The Board is, by law, a Federal Advisory Committee that conducts its business in public view and benefits from public input during its deliberations. Through these public meetings, Agency positions—and SAB science advice—are available for critical examination on their technical merits in an open forum.

Once the EPA receives the Board's advice, the Agency then chooses whether and how to factor the Board's advice into decisions on regulations, risk assessments, technical guidance, and research programs. This *Accomplishments Report* describes some ways in which the Board has had an impact on Agency decisions.

Science at the Crossroads: Why the SAB Matters Now

The EPA's decisions on tough environmental challenges depend on access to sound science. The EPA's SAB helps to strengthen how the Agency produces that science and how the science is used. Because it is a Federal Advisory Committee, the Board gives the Agency the benefit of different perspectives, different experience, and different scientific experience that can aid in addressing present and future environmental protection issues. The SAB, as a scientific and technical advisory committee, understands the essence of science is knowledge that is discussed, evaluated, and challenged in a public forum. In FY 2002, the Board sought new and more effective ways to provide public input that will encourage the highest quality science advice to be delivered to the Agency. SAB is continuing that effort in the year ahead.

THE EPA'S DECISIONS ON TOUGH ENVIRONMENTAL CHALLENGES DEPEND ON ACCESS TO CREDIBLE SCIENCE.

People Behind the Advice

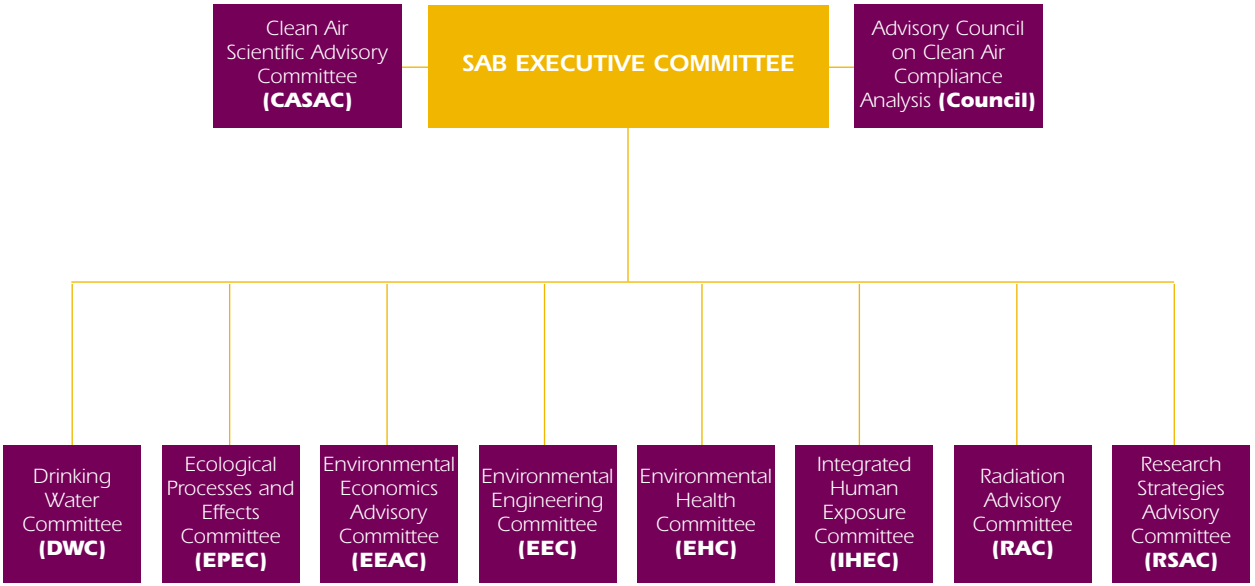
In FY 2002, the Board addressed a wide range of topics that provided different kinds of science advice to the EPA. The number of SAB members in any given year is flexible and responds to the number of experts needed to provide the EPA with science advice. In FY 2002, SAB consisted of 107 members appointed by the Administrator for two-year terms. Where additional expertise is needed, the Board supplements the knowledge, expertise, and experience of its members with consultants appointed by the SAB Staff Director, experts from other federal agencies (federal experts), and experts serving on other EPA Federal Advisory Committees (liaisons). In FY 2002, 69 consultants, two federal experts, and two liaisons worked with the Board.

The advice provided by the SAB is developed either by individuals serving on ad hoc panels established to address specific topics or by the SAB's standing committees augmented, if necessary, with special expertise provided by SAB consultants.

Whether they serve as members, consultants, federal experts, or liaisons, the scientists who develop SAB advice constitute a distinguished body of scientists, engineers, economists, and other social scientists who are recognized experts in their respective fields. These individuals are drawn mainly from academia; industry; federal, state, and tribal governments; research institutes; and environmental organizations throughout the United States.

The SAB is the chartered Federal Advisory Committee for eight standing committees, whose activities are coordinated by the SAB Executive Committee. These standing committees report to the Administrator through the SAB's Executive Committee. In addition, the chairs of two separately chartered Federal Advisory Committees, the Clean Air Scientific Advisory Committee (CASAC), and the Advisory Council on Clean Air Compliance Analysis, (the Council) are members of the SAB Executive Committee. These separately chartered committees report directly to the Administrator.

Coordination Within the SAB and with CASAC and the Council



Dr. William H. Glaze, Chair, SAB Executive Committee

Dr. William H. Glaze is a Professor in the Department of Environmental and Biomolecular Systems at the OGI School of Science and Engineering of the Oregon Health and Science University. He is also Professor Emeritus at the University of North Carolina in Chapel Hill, where he directed the campus-wide Carolina Environmental Program. From 1988 to 2001, he served as Editor of the journal, "Environmental Science and Technology," the highest rated publication of its type in the world. Since January 2000, he has been Chair of the Executive Committee of the EPA SAB. Previously, he was the first Chair of the SAB's Drinking Water Committee beginning in 1986.

Dr. Glaze received his B.S. degree in Chemistry from Southwestern University in 1956. He received M.S. and Ph.D. degrees from the University of Wisconsin in Madison in 1958 and 1960 and was a Robert A. Welch Post Doctoral Scholar at Rice University. He is the recipient of numerous awards, which include the Alexander von Humboldt Foundation Senior Science Award in 1997, Newsmaker of the Year Award of the American Chemical Society in 2000, and the Advanced Oxidation Technologies Award in 2001. His areas of research interest include analytical methods for the determination of organic compounds in water; ozone and advanced oxidation methods for water treatment and global evaluation of drinking water treatment alternatives. He has been involved in several initiatives related to sustainable environmental management and policy, including the interdependency between the U.S. and Mexico, the development of the Green Chemistry Institute, drinking and wastewater infrastructure in the U.S. and developing countries, future developments to minimize the impact of the automobile, and alternatives to command-and-control regulatory policy.

SAB Executive Committee

The SAB Executive Committee provides leadership for the Board by providing strategic advice and quality control. It sets the agenda and works with the Staff Office to ensure the highest standards. Since 2000, Dr. William Glaze has chaired the SAB Executive Committee.

SAB Staff Office

The activities of the Board's members, consultants and federal experts and liasons are supported by the EPA's SAB Staff Office. In FY 2002, the long-standing SAB Staff Director, Dr. Donald G. Barnes, retired, and the Administrator appointed Dr. Vanessa Vu as the new Director of the SAB Staff Office.

Since Dr. Vu joined the SAB staff in June 2002, she has worked with the SAB staff to support projects underway, to strengthen staffing and infrastructure in the office, and to enhance staff coordination with the Agency. Looking toward the future, she held a strategic planning retreat with the SAB staff in November 2002 to articulate the mission, vision, and values that will guide the Staff Office's work.

Dr. Vanessa T. Vu, Director, SAB Staff Office

Dr. Vanessa T. Vu comes to the SAB Staff Office from EPA's Office of Science Coordination and Policy within the Office of Prevention, Pesticides, and Toxic Substances, where she served as Director and provided leadership for the management of FIFRA's Scientific Advisory Panel. From 1998 to 2001, she served as Associate Director for Health in EPA's National Center for Environmental Assessment within the Office of Research and Development. She served as the Director of the Risk Assessment Division from 1995 to 1998 and the Deputy Director of the Health and Environmental Review Division from 1992 to 1995 in EPA's Office of Pollution Prevention and Toxics.

Dr. Vu received her B.A. degree in Biology and Chemistry from Case Western Reserve University in 1973 and her Ph.D. in Pharmacology from the George Washington University in 1980. Prior to joining EPA, she held several academic positions including a postdoctoral fellow at the Johns Hopkins University, Research Associate at the Vincent Lombardi Cancer Center, and Staff Fellow at the National Cancer Institute. Dr. Vu has served on many advisory and expert panels within and outside the EPA. She is the author or co-author of numerous research articles, EPA scientific reviews, and book chapters in pharmacology, toxicology, and risk assessment. She has received many honors for her scientific, management, and leadership accomplishments, including the Presidential Rank of Meritorious Senior Executive.

THE SAB STAFF OFFICE MISSION:

WE MUTUALLY SUPPORT THE BOARD IN PROVIDING INDEPENDENT, HIGH-QUALITY TECHNICAL AND SCIENTIFIC ADVICE TO THE AGENCY FOR THE PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT.

Highlights from SAB Advice in FY 2002

The EPA SAB's FY 2002 *Annual Staff Report* provides a full description of FY 2002 reports and activities. This *Accomplishments Report* highlights only a few major projects for FY 2002 to give a sense of their wide range and potential impact on the Agency. Because these reports are so recent, the Board has not received formal responses from the EPA Administrator, but Agency senior managers have provided preliminary responses regarding the reports' impact, and these responses are included below.

The timeline on pages 14-15 presents an even broader perspective of the Board ' s work and accomplishments. It highlights reports from the recent past (FY 1999-2002), where the Board received formal responses from the Agency or where Agency managers have noted the impacts of SAB advice on the production and use of science at the EPA.

A look at the SAB Committee and Panel Chairs who steered the major projects highlighted in this section gives a sense of the range of expertise and experience of the scientists who serve the Agency through the Board.

1. A Framework for Assessing and Reporting on Ecological Condition (EPA-SAB-EPEC-02-009)

In this self-initiated report, the SAB provided the Agency with a sample conceptual framework to serve as a guide for designing a system to assess, and then report on ecological condition at a local, regional, or national scale. The sample framework is intended as an organizing tool to help the EPA decide what ecological attributes to measure and how to aggregate those measurements to report more effectively on the state of the nation's environment and the improvements resulting from Agency programs.

Preliminary Agency Reponse from Dr. Peter Preus, Director, National Center for Environmental Research: "The report and the recommended framework provides a significant opportunity for the EPA and our partners to improve both the collection and use of ecological information. The EPA has committed to moving toward a results-based management system. This will require integrating indicators into goals, milestones, and strategies, and tracking our progress. The report the SAB provided will help the Agency to systematically identify the indicators and supporting data that will be needed to achieve our objectives.

The report has already demonstrated its value as an important tool for the Agency. The framework recommended in the report was adopted for describing the ecological condition

of the Nation in the *EPA's Report on the Environment* that will be released in spring 2003. The use of the framework in the *Report on the Environment* has helped the EPA and our partners to identify, assemble, and report on ecological condition. The framework has also helped us to identify gaps in both information and knowledge."

Dr. Terry Young, Senior Consulting Scientist, Environmental Defense
Chair: Framework for Assessing and Reporting on Ecological Condition

Dr. Terry Young is an independent consultant and has managed projects for Environmental Defense for more than twenty years. Her recent work includes the design of a system that uses economic incentives, including input pricing and tradable discharge permits, to control farm pollution in California's San Joaquin Valley. Additional work includes the development of ecological indicators to track management and restoration of ecological systems such as the San Francisco estuary. She has published on topics of economic incentives for environmental protection, indicators of ecological integrity, and market solutions for water pollution. Dr. Young received her B.S. in chemistry at Yale University and her Ph.D. in Agricultural and Environmental Chemistry from the University of California at Berkeley.

2. Review of the Office of Solid Waste's Study, Industrial Surface Impoundments in the United States: An EPA Science Advisory Report, EPA-SAB-EEC-03-001

In this report, the SAB advised the Agency on a study conducted to assess human-health and ecological risks associated with surface impoundments used to manage nonhazardous industrial waste. The Agency will use the study results to decide whether, and how, to apply land disposal restrictions or take other appropriate actions to address risks found and any regulatory gaps that may exist. The Board found the Agency's report to be a major advance in understanding the nature of industrial surface impoundments receiving non-hazardous liquid wastes.

Preliminary Agency Response From Dr. Michael Shapiro, Deputy Assistant Administrator, Office of Water , and Past Principal Deputy Assistant Administrator, Office of Solid Waste and Emergency Response: "This report was prepared at the request of the Office of Solid Waste and Emergency Response (OSWER) as a review of a Congressionally mandated study that characterized the risks associated with thousands of federally unregulated surface impoundments used to manage industrial waste. It is note-

Dr. Byung Kim, Staff Technical Specialist, Ford Motor Company
Chair: Solid Waste Surface Impoundment Advisory Report

Dr. Byung R. Kim is Staff Technical Specialist in the Physical and Environmental Sciences Department of Ford Research Laboratory, Dearborn, Michigan, and is a professional engineer. His current research interest is in understanding various manufacturing emission issues (physical/chemical/biological waste treatment processes and the overall environmental impact of manufacturing processes). He also has worked on the adsorption of organics on activated carbon and water quality modeling. He served on the advisory board for the National Institute of Environmental Health Superfund Basic Research Program at the University of Cincinnati. He received a Richard R. Torrens Award for editorial leadership from ASCE and two Willem Rudolfs Medals from the Water Environment Federation for his publications in industrial wastes.

He received a B.S. degree in Civil Engineering from Seoul National University in Korea in 1971 and M.S. and Ph.D. degrees in Environmental Engineering from the University of Illinois, Urbana, in 1974 and 1977 respectively.

worthy that SAB's engagement in this activity actually began at the outset of the effort when another panel of the SAB consulted with OSWER staff on the study design. Since the study had to be conducted under tight Congressional deadlines with limited budget, the early engagement by SAB was critical in developing an approach that had the best chance to address the policy issues associated with the subject facilities. As a result of that consultation, OSWER staff chose a tiered approach to sampling and analysis that allowed them to focus resources on the types of facilities that presented the greatest potential risk. In their review of the draft study report, the SAB panel members worked to understand the context of the work and the pragmatic judgments that had to be made in executing the study within time and budget constraints."

3. Review of Draft Trichloroethylene Health Risk Assessment: Synthesis and Characterization, EPA-SAB-EHC-03-002

In this peer review report, the SAB reviewed a draft hazard assessment for trichloroethylene (TCE), a chemical significant for being a nearly ubiquitous environmental contaminant in both air and water, being a common contaminant at Superfund sites, and listed in many federal statutes and regulations. It also provided advice on several important new areas in risk assessment: 1) risk to children and other susceptible populations; 2) cumulative risk; 3) examination of multiple kinds of evidence, including evidence about physiological and molecular modes of action; 4) the assessment of the health risks associated with the many metabolites of TCE; 5) the use of biologically based modeling; 6) the explicit recognition and acknowledgment of uncertainties in the risk analysis; and 7) the consideration of multiple data sets from animal and human studies to derive cancer slope factors.

Preliminary Agency Reponse from Dr. George Alapas, Acting Director, National Center for Environmental Assessment: "The SAB recently conducted a scientific peer review of the EPA's draft *Trichloroethylene Health Risk Assessment: Synthesis and Characterization.* This draft risk assessment includes a synthesis and characterization of both noncancer and cancer toxicity of trichloroethylene. The SAB's report provided a clear and comprehensive peer review of the EPA's draft assessment, and the comments by the SAB will be very helpful in improving the final assessment. As recommended, the EPA is currently revising the draft assessment based on the advice provided by the SAB as well as comments received from the public."

4. Affordability Criteria for Small Drinking Water Systems: An EPA Science Advisory Board Report, EPA-SAB-EEAC-03-004

This report represents the conclusions and recommendations of the EPA's SAB regarding the EPA affordability criteria that determine whether variances will be available to small systems as they implement maximum contaminant level regulations under the Safe Drinking Water Act. The Agency asked the SAB for

Dr. Henry Anderson, Chief Medical Officer, Wisconsin Division of Public Health
Chair: Trichloroethylene Health Risk Assessment

Dr. Anderson holds positions as the State Environmental and Occupational Disease Epidemiologist in the Wisconsin Department of Health and Social Services, Chief Medical Officer in the Wisconsin Division of Public Health, and adjunct Professorship at the University of Wisconsin - Madison, Department of Population Health, and the University of Wisconsin Institute for Environmental Studies, Center for Human Studies. His expertise includes public health; preventive, environmental and occupational medicine; respiratory diseases; epidemiology; human health risk assessment; and risk communication. Active research interests include: environmental health indicators and disease surveillance, childhood asthma, lead poisoning, reproductive and endocrine health hazards of sport fish consumption, arsenic in drinking water, chemical and nuclear terrorism, occupational and environmental respiratory disease, occupational fatalities, and occupational injuries to youth.

He was a founding member of the Agency for Toxic Substances and Disease Registry (ATSDR) Board of Scientific Councilors (1988-1992). He served on National Academy of Sciences/Institute of Medicine (NAS/IOM) committees that developed the reports "Injury in America" and "Nursing, Health & Environment." He serves on the Presidential Advisory Board on Radiation Worker Compensation, the Hanford Human Health Effects Subcommittee, and the Rocky Flats Advisory Committee for the Beryllium Program. He serves on the Centers for Disease Control and Prevention (CDC), National Center for Environmental Health, Director's Advisory Committee. He is a fellow of the Collegium Ramazzini and the American Association for the Advancement of Science. He is associate editor of the "American Journal of Industrial Medicine" and serves on the editorial board of "Cancer Prevention International. "

Dr. Anderson received his MD degree in 1972 from the University of Wisconsin, Madison. He was certified in 1977 by the American Board of Preventive Medicine with a sub-specialty in occupational and environmental medicine and in 1983 became a fellow of the American College of Epidemiology.

The EPA SAB—Meeting Challenges for Credible Science

Impacts of Recent Reports FY 1999-2002

Implementation of the Agency-Wide Quality System (EPA-SAB-EEC-LTR-99-002)
"…The Board's support in validating the concept of quality systems for environmental data systems and tools to be used for assuring data quality provide the backbone of the Agency's information quality guidelines."
Ms. Nancy Wentworth, Director, Quality Staff, Office of Environmental Information

National Human Exposure Assessment (NHEXAS) Pilot Studies (EPA-SAB-IHEC-ADV-99-004)
Review of the Draft Strategic Plan for the Analysis of National Human Exposure (NHEXAS) Pilot Study Data (EPA-SAB-IHEC-00-018)
"The SAB advice and review of ORD plans helped ORD set its directions for analysis of this rich data source needed to address Agency requirements associated with the Food Quality Protection Act and the Agency's mission to protect human health." **Dr. Gary Foley, Director, National Exposure Research Laboratory, Office of Research and Development**

Review of the Draft Document: Airborne Particulate Matter: Research Strategy, (EPA-SAB-CASAC-LTR-99-004)
"The work over the past five or six years in the area of particulate matter is truly striking…Through advice from the SAB and from the National Research Council, a strong plan was put together."
Dr. Paul Gilman, EPA Science Advisor and Assistant Administrator, Office of Research and Development

1999

Advisory on the Charter for the Council on Regulatory Environmental Modeling (CREM) (EPA-SAB-EC-ADV-99-009)
"EPA has been embarking on a number of initiatives to 'revitalize' the Council for Regulatory Environmental Modeling (CREM)." **Dr. Gary Foley, Director, National Exposure Research Laboratory, Office of Research and Development**

EPA Guidelines for Preparing Economic Analysis (EPA-SAB-EEAC-99-020)
"The Guidelines had to reflect the very latest advancements of economics, but be practical enough to be useful to the economists at EPA. EEAC worked with us to develop the best overall design of the Guidelines.… These Guidelines continue to govern the conduct of economic analysis in the agency." **Dr. Albert McGartland, Director, National Center for Environmental Economics, Office of Policy Economics and Innovation**

Improved Science-Based Environmental Stakeholder Processes (EPA-SAB-EC-COM-01-006)
"The Agency's Final Public Involvement Policy, scheduled for release this spring, will reflect many of the concerns raised in your report and will recognize the role that sound science can and must play in EPA's decision-making processes."
Gov. Christine Todd Whitman, Administrator

NATA-Evaluating the National-Scale Air Toxics Assessment 1996 Data - An SAB Advisory EPA-SAB-EC-ADV-02-001

"EPA intends to act on all of the Panel ' s near-term recommendations, incorporating them either directly into the publication of 1996 NATA results on the Internet or into short-term studies whose results would be published in technical reports and linked to the NATA web site."
Gov. Christine Todd Whitman, Administrator

Monitored Natural Attenuation: US EPA Research Program - An EPA Science Advisory Board Review (EPA-SAB-EEC-01-004)

"I am pleased that the SAB found the work to be scientifically sound and that it has improved the understanding of Monitored National Attenuation (MNA) Research Program and its applications."
Gov. Christine Todd Whitman, Administrator

Arsenic Rule Benefits Analysis: An SAB Review (EPA-SAB-EC-01-008)

"The final report…contributed greatly to our better understanding of the many issues that underlie the arsenic in drinking water regulation and played a key role in the Agency's decision on the final arsenic standard." **Gov. Christine Todd Whitman, Administrator**

Review of the Southeastern Ecological Framework: An EPA Science Advisory Board Report (EPA-SAB-EPEC-LTR-02-002)

"Integration of various regional assessment approaches and applying the SAB Framework for Assessing and Reporting on Ecological Condition are important next steps now under review by the Critical Ecosystems Steering Committee."
Gov. Christine Todd Whitman, Administrator

Review of the Draft Analytical Plan for EPA's Second Prospective Analysis - Benefits and Costs of the Clean Air Act 1990-2020 (EPA-SAB-COUNCIL-ADV-01-004)

"The Council's efforts provide a balanced and thoughtful review of the EPA's initial proposals for the design of the study and offer many creative solutions to the challenges the Agency will face in its implementation." **Gov. Christine Todd Whitman, Administrator**

Review of the Agency's Draft Continuous Monitoring Implementation Plan: A Review by the Clean Air Scientific Advisory Committee (EPA-SAB-CASAC-LTR-02-001)

"…EPA is already taking steps to incorporate the Subcommittee's comments and recommendations into the next iteration of our Continuous Monitoring Implementation Plan, and we will look forward to enhancing the ambient air monitoring network with these improved technologies." **Gov. Christine Todd Whitman, Administrator**

2003

FY 2003 Presidential Science and Technology Budget Request for the Environmental Protection Agency; An SAB Review (EPA-SAB-RSAC-02-007)

"…EPA's continued emphasis on science and technology reflect recognition of the importance of maintaining a strong scientific foundation upon which decisions are made." **Gov. Christine Todd Whitman, Administrator**

Dr. Robert Stavins, Albert Pratt Professor of Business and Government, John F. Kennedy School of Government, Harvard University
Chair: Affordability Criteria for Small Drinking Water Systems Report

Dr. Robert N. Stavins also serves as Director of the Environmental Economics Program at Harvard University. He is a University Fellow of Resources for the Future, Past Chairman of the Environmental Economics Advisory Committee of the EPA's SAB, Director of the University-wide Environmental Economics Program at Harvard University; and a member of the EPA's Clean Air Act Advisory Committee, the Intergovernmental Panel on Climate Change (IPCC), the Board of Directors of the Robert and Renée Belfer Center for Science and International Affairs, the Executive Committee of the Harvard University Committee on Environment (UCE), and the Board of Academic Advisors of the AEI-Brookings Joint Center for Regulatory Studies.

Dr. Stavins' research has focused on diverse areas of environmental economics and policy, including examinations of: policy instrument choice under uncertainty, competitiveness effects of regulation, design and implementation of market-based policy instruments, diffusion of pollution-control technologies, and depletion of forested wetlands. His current research includes analyses of: technology innovation, environmental benefit valuation, political economy of policy instrument choice, and econometric estimation of carbon sequestration costs. Professor Stavins directed Project 88, a bi-partisan effort co-chaired by former Senator Timothy Wirth and the late Senator John Heinz, to develop innovative approaches to environmental and resource problems. Prior to coming to Harvard, Dr. Stavins was a Staff Economist at the Environmental Defense Fund, and before that, he managed irrigation development in the Middle East and spent four years working in agricultural extension in West Africa as a Peace Corps volunteer.

advice on: 1) the EPA's basic approach to determining affordability for small systems (i.e., comparing average compliance costs with an expenditure margin); 2) components of the affordability determination method (i.e., use of median household income, alternatives to the 2.5% affordability threshold, calculation of the expenditure baseline); 3) the application, focus and/or definition of affordability (i.e., the use of separate national level affordability criteria for ground water vs. surface water systems; the need for making affordable technology determinations on a regional rather than a national basis); and 4) whether financial assistance should be considered in EPA's national level affordability criteria.

The report presents the SAB's findings and recommendations on the Agency's charge questions. The report notes that the Agency's basic approach is justified on the basis of equity and efficiency considerations, as well as considerations of administrative practicality. The SAB also addressed limitations of the basic approach and suggested the EPA modify it where appropriate and possible. They encouraged the Agency to consider options of system consolidation when analyzing the nature

and duration of any standards relaxation and noted that the use of a national trigger as a screening device suggests the adoption of a fairly low affordability threshold. The SAB encouraged the EPA to develop clear and formal guidelines about when variances should be granted at the local level and to conduct research into possible mechanisms for achieving greater equity in distribution of water costs to individuals.

Preliminary Agency Response from Dr. Albert McGartland, Director, National Center for Environmental Economics: "Throughout the deliberations on the Affordability Criterion, the SAB's Environmental Economics Advisory Committee was careful to draw distinctions between matters of economic science and policy decisions. It was a triumph of the Committee that they succeeded in reviewing and suggesting improvements to the economic measurement of affordability without stepping on the policy button. As a result, policy makers will be in a better position to design an affordability criterion with appropriate economic parameters consistent with their policy goals."

Dr. A. Myrick Freeman, Professor, Bowdoin College
Chair: UST and RCRA Program Benefits, Costs and Impacts Assessment

Dr. A. Myrick Freeman is the William D. Shipman Research Professor of Economics at Bowdoin College, where he has been on the faculty since 1965 and has served as Chair of the Economics Department as well as Director of the Environmental Studies Program. Dr. Freeman's principal interests are in the areas of applied welfare economics, benefit–cost analysis, and risk management as applied to the development of models and techniques for estimating the welfare effects of environmental changes, such as the benefits of controlling pollution and the damages to natural resources due to releases of chemicals into the environment. Dr. Freeman received his Ph.D. and M.A. in Economics from the University of Washington and his A.B. in Economics from Cornell University.

5. Underground Storage Tanks (UST) Cleanup & Resource Conservation & Recovery Act (RCRA) Subtitle C Program Benefits, Costs, & Impacts Assessments: An SAB Advisory, EPA-SAB-EC-ADV-03-001

Through this report, the SAB advised the Agency on methods and approaches for measuring benefits and costs for the Agency's Underground Storage Tank and Resource Conservation and Recovery Act (RCRA) Hazardous Waste Program.

The Panel offered advice on measuring benefits, costs and impacts in terms of human health benefits, ecological benefits, indicators, avoided costs, the property value approach, as well as alternative approaches. Other topics touched upon dealt with distributional impacts, including environmental justice, intragenerational impacts, economic impacts, risk tradeoffs, and intergenerational equity.

Dr. Valerie Thomas, Research Scientist, Princeton University
Chair: Metals Action Plan Report

Dr. Valerie Thomas is a Research Scientist at the Princeton Environmental institute at Princeton University. Dr. Thomas received her Ph.D. in theoretical physics from Cornell University and was a post-doctoral Research Fellow at the Department of Engineering and Public Policy at Carnegie Mellon University.

Her research is in the areas of Industrial Ecology and Environmental Policy. Recent research topics include mercury exposure, dioxin sources, the economic demand impacts of second-hand markets, electronics for product recycling, environmental policy in the former Soviet Union, and ethanol as a gasoline lead replacement in Africa. She is co-author of the book "Industrial Ecology and Global Change," (Cambridge University Press, 1994). She is a Fellow of the American Physical Society. She will be vice-chair of the Gordon Conference on Industrial Ecology in 2004 and chair in 2006.

Preliminary Agency Reponse from Dr. Michael Shapiro, Deputy Assistant Administrator, Office of Water, and Past Principal Deputy Assistant Administrator, Office of Solid Waste and Emergency Response: "This panel was convened in 2002 to review two documents covering methodologies for evaluating costs, benefits and related impacts of programs under the Resource Conservation and Recovery Act (RCRA) Hazardous Waste Program and the Underground Storage Tank (UST) Program. The panel suggested a revised framework for the proposed analyses which the Office of Solid Waste and Emergency Response (OSWER) believes will provide a more rigorous and credible structure while still meeting the Office's primary objectives in undertaking the studies. The panel also identified broader analytical issues that need to be considered across Agency programs in evaluating human health and ecological benefits. OSWER staff were particularly pleased with the extensive interaction with the panel afforded by the process."

"The Scope of the Board's work is potentially as wide as all of the scientific and technical issues associated with environmental problems."

6. Review of Metals Action Plan: An EPA Science Advisory Report, EPA-SAB-EC-LTR-03-001

The Metals Assessment Panel of the EPA SAB reviewed the EPA's Metals Action Plan for development of a Framework for Metals Risk Assessment and a Guidance for Characterization and Ranking of Metals. The Plan identifies the Agency's view of the key scientific issues important for assessing the hazards and risks of metals in general. This review addresses the broad scientific issues underlying the assessment of metals hazards and risks. Overall, the Panel agreed that metals should be assessed differently from organic pollutants in a

number of contexts. The Panel also agreed that the issues of chemical speciation, bioavailability, bioaccumulation, and toxicity are key issues in assessing the hazards of metals and that by considering the scientific issues broadly in development of an overall framework, the EPA can develop a scientific foundation to support appropriate simplifications in particular applications.

Preliminary Agency Response from Dr. William Wood, Director, Risk Assessment Forum Staff : "The Agency appreciates the efforts of the SAB in conducting the recent review of the Agency's Action Plan for development of a Framework for Metals Assessment and a Guidance for Characterization and Ranking of Metals. The SAB's Metals Assessment Panel provided review comments that will make a fundamental and positive contribution to the future assessment practices of the Agency regarding metals. Since this review marked the initiation of activities, the Agency looks forward to a continuing dialogue with the SAB on these challenging issues and intends to submit for SAB review the Framework for Metals Assessment and the Guidance for Characterization and Ranking Metals in FY 2004."

Dr. Janet Johnson, Senior Technical Advisor, MFG, Inc.
Chair: Multi-Agency Radiological Laboratory Analytical Protocols Manual

Dr. Janet Johnson is currently employed at MFG, Inc. in Fort Collins, CO, as a Senior Radiation Scientist with expertise in health physics, chemistry, and environmental health. She is a certified industrial hygienist (CIH, radiological aspects) in the comprehensive practice of health physics by the American Board of Health Physics. She serves on the Governor's (Colorado) Radiation Advisory Committee since 1988 as well as the Governor's Rocky Flats Scientific Panel on Monitoring, the Colorado Hazardous Waste Commission. She also serves on the National Academy of Sciences Committee on Low-Level Radioactive Waste Siting in New York State (1993 to the present) and is a Fellow of the Health Physics Society.

Dr. Johnson has broad-based consulting experience dealing with such topics as nuclear safety and assessment of radiation risks. Her training includes a B.S. in Chemistry from the University of Massachusetts, an M.S. in Health Physics (as an AEC Health Physics Fellow) from the University of Rochester, and a Ph.D. in Microbiology and Environmental Health from Colorado State University.

7. Multi-Agency Radiological Laboratory Analytical Protocols (MARLAP) Manual: An SAB Report (Draft Report being developed by the Radiation Advisory Committee)

The MARLAP Review Panel reviewed technical aspects of a draft Multi-agency Radiological Laboratory Analytical Protocols (MARLAP) Manual dated August 2001. This document was developed collaboratively by seven federal agencies, departments, and commissions having authority for regulating radioactive materials, and two states. The Panel found that MARLAP effectively addresses the need for a nationally consistent, performance-based approach for planning, implementing, and assessing radioanalytical measurements to address regulatory concerns. The Panel made recommendations for reorganizing and editing the MARLAP manual, and for training persons who will use it.

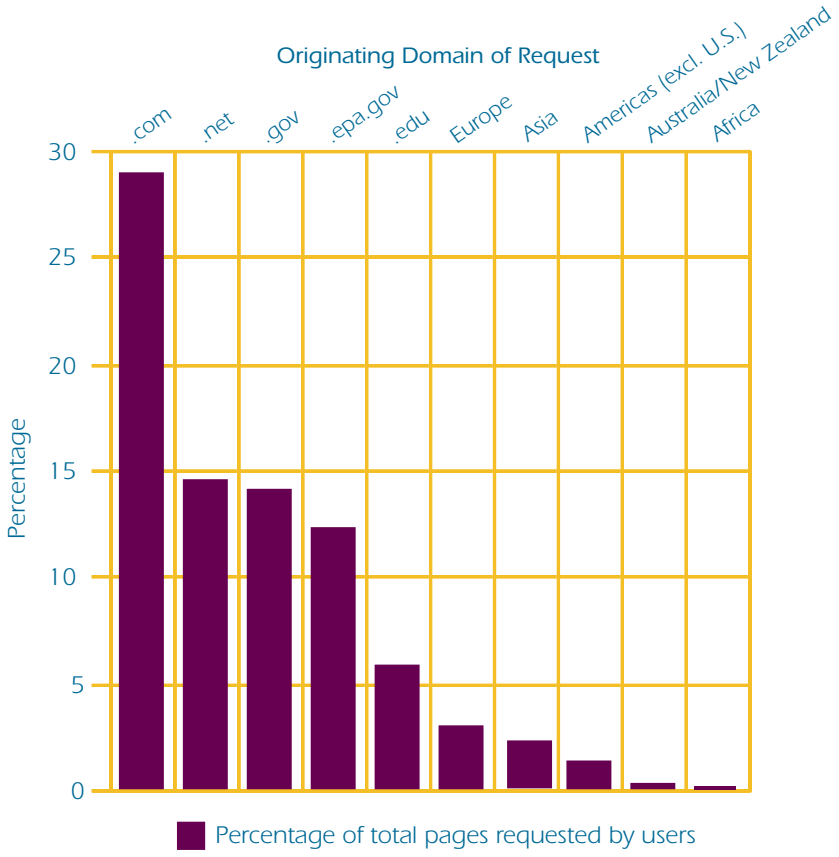
Preliminary Agency Response from Ms. Elizabeth Cotsworth, Director, Office of Radiation and Indoor Air: "In a recently released draft report, the SAB provided peer review of the Multi-Agency Radiation Laboratory Analytical Protocols (MARLAP) document, a technical guidance manual on detecting radionuclides for project managers and radioanalytical laboratories. The guidance will allow the EPA clean-up programs and six other federal agencies to benefit from detection methods that translate into meaningful measures of exposure to radiation risk. It provides a model for how multiple agencies can benefit in a coordinated way from practical scientific advice. The advice itself and the multi-agency coordination effort may have future significance for homeland security. The multi-agency team that developed the MARLAP also benefitted from the SAB's comprehensive review and interactions the team had with the SAB's Radiation Advisory Committee."

SAB Information Reaches Beyond the EPA

Although the Board's purpose is to provide advice to the Agency, the demand for advice generated by the SAB isn't limited to the EPA or even to the United States alone. Analysis of the use of the SAB web site **(www.epa.gov/sab)** shows that both commercial and non-EPA governmental organizations access the site more than all of the EPA's offices combined. Thus, while the SAB's mission is to advise the EPA on its science, many customers for SAB information are from outside the Agency.

In addition, SAB information is also requested from users around the world. About seven percent of the total pages requested are from non-U.S. domains, with European sites the largest customers followed by Asia and the Americas. Therefore, the SAB has the potential for worldwide impact by making information products available around the world.

Selected SAB Web Page Statistics for Nov. 1–Nov. 30, 2002



Improving the Process for Developing SAB's Advice

In FY 2002, the SAB Staff Office introduced new processes for forming advisory panels, reviewing information to make decisions about conflict of interest and balance of viewpoints, working with stakeholders, and coordinating with EPA clients.

With the advice of the SAB Executive Committee's Policies and Procedures Subcommittee, the Staff Office implemented a new panel formation process to help the Board provide high-quality advice while better meeting the requirements of the Ethics in Government Act and the Federal Advisory Committee Act and improving transparency so the public can understand and participate in the SAB panel formation process. The SAB Staff Office designed and implemented, with public input, a new four-step panel formation process and a new *Confidential Financial Disclosure Form for Special Government Employees Serving on Federal Advisory Committees at EPA*. It also developed and implemented new CD-ROM-based ethics training for all SAB members and consultants. These innovations have improved how the SAB staff gather and evaluate information about prospective panel members' potential conflicts of interests and how the SAB staff organize panels to assure balanced points of view. These processes have set new standards for peer review and operations of Federal Advisory Committees at the EPA and across the federal government. The new panel formation process is described in an *Overview of the Panel Formation Process at the Environmental Protection Agency SAB* and is outlined on the next page.

Stages in Panel Formation

* The staff gathers additional information about the candidates (including confidential information from the candidates about financial conflict of interest). They also ask the public for information that will help during the Panel Selection Phase.

The Board also began a series of regular meetings with stakeholders on public involvement in the SAB Advisory Board activities. In a Federal Register Notice, it invited participants to attend a public session on September 26, 2002, or to submit written public comments on selected topics for improvements in SAB policies and procedures. The purpose of the session on September 26, 2002, was to discuss two topics: 1) improved public involvement in SAB public meetings and in development of SAB reports, and 2) improvement of the SAB's public access web site. Much of the discussion also concerned the Board's new panel formation process and the need for transparency in forming panels. The SAB Staff Office summarized the public session as a *Stakeholder Meeting Report*, posted it on the SAB web site, and plans to consider these concerns and suggestions as it develops guidance and plans for the Staff Office in its support of the Board.

In FY 2002, the EPA Staff Office worked to improve board processes with input from a cross-agency group of Agency senior managers—the Agency's Science Policy Council—and with leadership of the National Academy of Sciences and National Research Council.

Activities at the Crossroads: Outlook for FY 2003—Change and Opportunities

Continuing to Improve the Process for Developing Advice

The SAB Staff Office plans to continue its efforts to strengthen opportunities for public involvement in Board processes. A major goal is continued improvement in the Board's panel formation process, with more consistency and better communication with the public. In addition, the Staff Office is planning to develop guidance for panel chairpersons, members of panels, SAB staff, Agency staff, and members of the public to clarify their roles and the role of public involvement in SAB reports and meetings. It foresees continued improvement in the SAB public access web site, so that users will have information and tools necessary to interact effectively with the Board and the SAB Staff Office.

The Staff Office plans to hold semi-annual meetings with members of the public in the spring and fall of 2003 to hear concerns and suggestions for additional improvements in SAB policies and procedures.

Restructuring the Board

An additional major effort of the Board for FY 2003 complements the project work of the members and consultants that will result in advice to the Agency in new areas and Staff Office efforts to further improve policies and procedures. A subcommittee of the SAB Executive Committee was established in October 2002 to examine whether the current structure and size of the Board enable the Board's keeping pace with and, even more importantly, anticipating the scientific and technical issues facing the Agency.

Photo by Steve Delaney, EPA Photographer

The Chair of the SAB Executive Committee, Dr. William Glaze, chairs the subcommittee, and he is working with the SAB staff to solicit input regarding the restructuring effort from SAB members and consultants, EPA staff, and interested members of the public. His initial thoughts on the restructuring effort and its importance follow.

The SAB: A Grand Tradition and a Great Future

Since 1978, the EPA Science Advisory Board has arguably been the most effective science advisory board in the federal government. All who are familiar with the Board know that it has made many contributions to helping the Agency maintain a high level of science in the decisions it has made, the regulations it has promulgated, and the programs it has established. Now the SAB shares with the Agency new challenges, and it is appropriate for us to ask: Can we do our job even more effectively?

Since I became involved with the SAB in the late 1980s, I have shared with many of my colleagues a deep respect for the SAB staff who do its work on a day-to-day basis and the many fine scientists who contribute to its panels and the standing committees as a public service. This is one aspect of the SAB that I know will never change, and whatever we do in the future, we must continue to find and retain the best people for these positions. We must admit, however, that the world is changing and if we wish to protect it, we too must change.

What are these changes and what do they portend for the way the SAB does its business? The first I want to mention is really not a change; it is a realization that all environmental problems are much more complex than we acknowledged in the past. In the early days of environmental protection, it was understandable for us to focus on the pollution that was apparent to anyone; to arrange our programs around media: air, water, and soil; to focus on single compounds rather than the ubiquitous mixtures around us; or to treat human health and ecological health as if they were unrelated. The intervening years have shown us that this strategy is neither scientifically defensible nor always conducive to good policy making. At the most general level the environment and public health have to be understood as a system, and we must always be aware of links between its various compartments as we try to make decisions to protect it. Dealing with this through a systems approach is one of our challenges, one that we must help the Agency deal with.

Fortunately, science can provide us with the ways to deal with these complex systems; but this raises another challenge for the SAB. As any science grows more deeply specialized, it becomes increasingly difficult for a non-specialist to understand, even one grounded in the basics. New science makes the work of the Agency more credible in principle, but how does the SAB face the challenge of reviewing this work of increasing depth and complexity? There is really only one solution for the SAB: we simply must convince the best people from all of the important research areas to serve as expert reviewers if we are to give the Agency the best advice. Is the current way we do business in the SAB accomplishing this goal? If not, we must find a better way.

Another major development in environmental protection that is reflected on the SAB is this: we have come to understand that environmental protection is not only an enterprise of the physical, biological, chemical, and engineering sciences. For environmental decisions to be made and implemented effectively we must bring the economics and the social and behavioral sciences into the process sooner and more effectively. We must take into account how people make their decisions; how they value protection of themselves, endangered species, and ecosystems; and how environmental protection fits into the entire regime of economic and social development. We must acknowledge that the study of these and other human characteristics is a sophisticated scholarly enterprise that must be factored into our work. Of course, wise heads in the Agency and the SAB knew this all along, but too often our narrow professional focus causes us to omit the very factors that might make our work more effective.

Finally, in the future we must assist the Agency in anticipating the problems of the future and how the Agency might address them, often with programs that go beyond command and control. For example, we might help develop a better assessment of complex topics such as the effects of climate change on ecosystems, which will probably be rectified by education and voluntary actions rather than regulations. We should also help the Agency develop ways to assess the state of the environment and through careful analysis suggest how this type of assessment can guide future Agency program development. And finally, we must assist the Agency to recognize, anticipate and respond to new challenges that are not anticipated at this time. The SAB, therefore, must be an agile and responsive organization while continuing its call for the very highest standards in its work and its reviews.

William H. Glaze, Ph.D.
Chair, SAB Executive Committee

Upcoming Science Advice Activities:

To develop an agenda for FY 2003, the SAB Staff Office coordinated discussions with the Agency's Science Policy Council and the SAB Executive Committee. At the start of the fiscal year, the project list that resulted included: 25 peer review projects, three advisories, eight consultations, and two workshops or self-initiated projects. Nine of these projects involve multi-disciplinary or multi-media science issues and will be undertaken by special panels of the SAB Executive Committee.

Charge to the Special Panel on "Valuing the Protection of Ecological Systems and Services":

1. Enhance the ability of ecological, economic, social, and technological analysis to contribute useful assessment of the value of changes in and the protection of ecosystems and ecosystem services.

2. Explore alternative approaches (e.g., benefit-cost analysis, ecological analysis, and the analysis of public concerns and values) in terms of the soundness and reliability of the methods involved, the current evidentiary base associated with each, data gaps, and potential contributions to decision making.

3. Identify and prioritize research needs to: further develop each of the approaches above, develop innovative strategies for new research, and encourage new investigators to address ecosystem valuation.

4. Compare the different approaches, identifying areas of convergence and divergence and the potential for developing more integrative and synthetic approaches.

5. Make recommendations as to how these alternative approaches may inform and be incorporated in the Agency's protection of ecological systems and services and to contribute to the work of other SAB committees.

The work the Board will actually undertake depends in great part on the Agency's priorities and readiness to receive SAB advice or undertake SAB review, so the annual "operating plan" of the Board is subject to change.

Based on conversations with Agency leadership, the Board foresees important future work in modeling, data quality, social sciences, ecological issues, and new approaches to toxicology that integrate computational sciences and genomics, as well as peer review of selected chemicals and significant issues related to risk assessment.

One planned activity for FY 2003 is a project initiated by the SAB Executive Committee: "Valuing the Protection of Ecological Systems and Services." The project will be a multi-year effort, developed in response to Agency-wide issues the Board has addressed over many years: the need to highlight the importance of the sciences supporting ecological protection and the need to characterize as fully as possible the benefits of protecting ecological systems and services. The SAB Executive Committee envisions the panel as being multi-disciplinary — bringing together economists, ecologists, decision scientists,

engineers, and other kinds of social scientists to work in close partnership with the Agency to develop advice for improving current practices for assessing the value of protecting ecological systems and services, and to identify the most valuable research opportunities in this area.

Looking Ahead and Reaching Out

The Board's priorities are to provide independent advice on priority topics as requested by EPA offices and to address emerging science issues of importance to the Agency. To improve how it provides that advice, the Board and the Staff Office continue to strengthen the "infrastructure" of the Board through possible restructuring efforts and through strategies to recruit and retain the best and diverse talents for the Board. Other priorities include improving policies and procedures and enhancing communication both within the Agency and with members of the public so that the work of the Board can be better understood and the Board can better serve needs for science advice to improve environmental protection.

The SAB staff and the leadership of the Board seek the public's information and insights on upcoming SAB advisory topics and on opportunities to improve policies and procedures at the Board. They are also seeking future members of the Board, individuals with the technical knowledge, experience, and expertise willing to work with others to provide science advice to the Agency, so that the work and tradition of the Board may continue.

NOW THE SAB SHARES WITH THE AGENCY NEW CHALLENGES, AND IT IS APPROPRIATE FOR US TO ASK: CAN WE DO OUR JOB EVEN MORE EFFECTIVELY?

United States
Environmental
Protection Agency

EPA Science Advisory
Board (1400A)
Washington DC

EPA-SAB-03-007
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www.epa.gov/sab